Standard Operating Procedure for the Determination of pH

1.0 Location

Room 306

2.0 Purpose

This method is used to determine pH in water.

3.0 Scope

3.1 Principle

The pH of a solution refers to its hydrogen ion activity and is expressed as the logarithm of the reciprocal of the hydrogen ion activity in moles per liter at a given temperature. The practical pH scale extends from 0, very acidic, to 14, very alkaline, with 7 corresponding to exact neutrality at 25°C. The glass electrode is used in combination with a calomel reference electrode. The glass-reference electrode pair produces a change of 59.1 mV/pH unit at 25°C.

3.2 Interferences

The glass electrode is relatively free of interference from color, turbidity, colloidal matter, oxidants, reductants, or high salinity, except for a sodium error at a high pH. Temperature exerts two significant effects on the pH measurement: the pH potential, i.e., the change in potential per pH unit, varies with temperature; and the ionization in the sample also varies. The first effect can be overcome by a temperature compensation adjustment provided on the better commercial instruments. The second effect is inherent in the sample and is taken into consideration by recording both temperature and pH of each sample.

4.0 Reference

EPA Method 150.1

5.0 Sample Handling and Preservation

Refrigerate samples at 4° C.

6.0 Apparatus and Materials

6.1 pH Meter.

6.2 Glass-Body Combination electrode with AG/AG/reference with BNC.

6.3 Magnetic stirrer, with Teflon-coated stirring bar.

7.0 Reagents

7.1 Standard Solutions

Use commercially available buffer solutions that are color coded. 7and 10

8.0 Procedure

8.1 Place approximately 30 ml of the10 buffer in a disposable beaker with stir bar.

8.2 Place on stirrer and press standby.

8.3 Press two point calibration.

8.4 Enter buffer10 and press enter.

8.5 Record in millivolts and press enter.

8.6 Repeat with buffer 7- rinsing electrode with DI water.

8.7 Press efficiency and record efficiency.

8.8 Press efficiency and record slope and temperature and press enter.

8.9 Check QC with 8 buffer. Place approximately 30 ml of 8 buffer in a disposable beaker with stir bar and place on stirrer. Press meas/monitor - when stable take reading (the meas/monitor button may have to be pressed more than once if there is a drift as it beeps and freezes value on display quickly).

8.10 Place sample in disposable beaker with stir bar and place on stirrer. Press

meas/monitor to take pH reading.

8.11 Dup 10% of the samples.

9.0 Quality Control

6.1 The efficiencies may be seen for the calibration by pressing slope/eff. Efficiencies should be between .97 and 1.03 or recalibrate; record on log sheet.

6.2 Duplicate 10 % of all samples.

10.0 Data analysis

Results are read directly from the instrument display.

11.0 Documentation

All information and values are recorded on a worklist and entered into the LIMS system.

12.0 Records

Worklists are stored in a parameter log book in the bookcase in room 305